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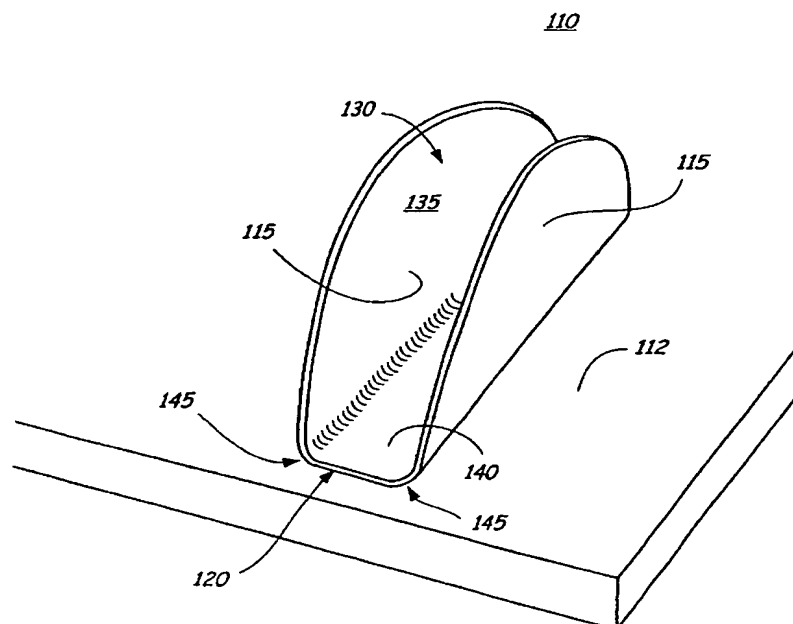
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- Declarations under Rule 4.17:**  
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations*

[Continued on next page]

(54) Title: SQUARE BOTTOM TACO SHELL



(57) Abstract: A stable, self-standing, taco shell is provided. The taco shell has a first sidewall element, a second sidewall element, a substantially flat base element of defined width, a first curved element interconnecting the first sidewall element to the flat base element; and a second curved element interconnecting the second sidewall element to the flat base element. Methods of fabrication and use are disclosed.

## SQUARE BOTTOM TACO SHELL

### FIELD OF THE INVENTION

**[001]** The present invention relates to an edible food shell. More specifically, the present invention relates to a taco shell.

### BACKGROUND OF THE INVENTION

**[002]** A conventional taco shell is formed by placing a circular tortilla in a U-shaped mold. The tortillas used for conventional tacos are typically between 5.0 and 7.5 inches in diameter. Once the tortilla has taken on the shape of the mold, the tortilla is made generally rigid by baking or deep fat frying. The resulting taco shell 10 is U-shaped when viewed from the end (see FIG. 1).

**[003]** As shown in FIG. 1, a conventional taco shell 10 will have a pair of opposed sidewalls 15 that are interconnected by a generally semi-circular or round base 20. Often, each sidewall 15 diverges from the vertical centerline of the shell 10 by approximately 25 degrees, as indicated by angle "A" in FIG. 1. The top edge 25 of each sidewall 15 is free of connection to the opposing sidewall 15, creating the open end 30 of the shell 10. The sidewalls 15 and base 20 define a cavity 35 in which taco filling (e.g., lettuce, beans, cheese, cooked meat or poultry or the like) is placed.

**[004]** As can be seen in FIG. 1, the base 20 of the conventional taco shell 10 is relatively narrow as compared to the height of the shell 10. The conventional taco shell's configuration and narrow base 20 prevent taco consumers from filling the cavity 35 with preferred amounts of meat without overly limiting the space available for other types of taco filling. For example, if a consumer puts in more than minor amounts of meat, the remaining space within the cavity 35 is insufficient to allow the inclusion of adequate amounts of other available fillings like lettuce, cheese, tomatoes, black olives, sour cream, etc. Another problem is that the narrow base 20 prevents a utensil (e.g., a spoon) from being placed near the base of the taco shell 10 when used to fill the taco shell 10 with meat or other filling.

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[010] In one embodiment, the stable, self-standing, taco shell has a first sidewall and a second sidewall interconnected by a substantially flat base. The taco shell is configured so that the height of the taco shell is approximately about 50-110 millimeters (2.0 to 4.0 inches) and the width of the base is at least 10-15 millimeters (0.50 inch). In another embodiment, the width of the base is at least 19 millimeters (about 0.75 inch). In yet another embodiment, the width of the base is approximately 25 mm (about 1.0 inch).

[011] In one embodiment, the stable, self-standing, taco shell has a first sidewall element, a second sidewall element, a substantially flat base element, a first curved element interconnecting the first sidewall element to the flat base element, and a second curved element interconnecting the second sidewall element to the flat base element. In one embodiment of this taco shell, at least one of the elements will have a thickness of at least 1.5 millimeters. In one embodiment of this taco shell, at least one of the elements will have a thickness of less than 1.5 millimeters. In other embodiments of this taco shell, the curved elements may have large, medium or small radii.

[012] The present invention, in several embodiments, further resides in methods of making a stable, self-standing, taco shell. In one embodiment, the method entails providing a soft flexible uncooked or partially cooked tortilla and placing the tortilla in or on a mold. The mold is configured so the resulting taco shell has a first sidewall and a second sidewall interconnected by a substantially flat base, and the height of the resulting taco shell is approximately 1.50 to 4.0 times the base width of the taco shell.

[013] In one embodiment, the present methods of making a stable, self-standing, taco shell involves providing a tortilla and placing the tortilla into or on a mold. The mold is configured so the resulting taco shell has a first sidewall element, a second sidewall element, a substantially flat base element, a first curved element interconnecting the first sidewall element to the flat base element, and a second curved element interconnecting the second sidewall element to the flat base element. In one embodiment of this method, at least one of the elements will have a thickness of at least 1.5 millimeters. In one

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## BRIEF DESCRIPTION OF THE DRAWINGS

[017] FIG. 1 is an end elevation view of a conventional U-shaped taco shell.

[018] FIG. 2 is an isometric view of a self-standing taco shell having a substantially flat base and sitting upright on a flat preparation surface.

[019] FIG. 3a is an end elevation view of the self-standing taco shell of FIG. 2 having large radius curved segments.

[020] FIG. 3b is an end elevation view of the self-standing taco shell of FIG. 2 having medium radius curved segments.

[021] FIG. 3c is an end elevation view of the self-standing taco shell of FIG. 2 having small radius curved segments.

[022] FIG. 3d is an end elevation view of the self-standing taco shell of FIG. 2 after the shell has failed at one of the shell's two curved segments.

[023] FIG. 4 is an isometric view of a self-standing food trough having a substantially flat base and sitting upright on a flat preparation surface.

[024] FIG. 5 is an end elevation view of the self-standing food trough of FIG. 4.

[025] FIG. 6 is a flow chart illustrating a method of manufacturing a self-standing taco shell having a substantially flat base.

[026] FIG. 7 is a flow chart illustrating a method of using a self-standing taco shell having a substantially flat base.

[027] FIG. 8 is an isometric view of a tray having a surface that may be used to further stabilize the taco shell of the present invention.

## DETAILED DESCRIPTION

[028] FIG. 2 is an isometric view of a self-standing taco shell 110 formed from a circular tortilla. FIG. 2 depicts the taco shell 110 sitting upright, without assistance, on a flat preparation surface 112.

[029] FIG. 3a is an end elevation view of the same self-standing taco shell 110 shown in FIG. 2. As shown in FIG. 3a, the taco shell 110 includes a

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the open end width  $D_e$  is approximately 35 to 44 millimeters (about 1.375 to 1.75 inches). In another embodiment, the base width  $D_b$  is approximately 19 to 39 millimeters (about 0.75 to 1.5 inches) and the open end width  $D_e$  is approximately 44 to 51 millimeters (about 1.75 to 2.0 inches). Finally, in yet another embodiment, the base width  $D_b$  is approximately 25 millimeters (about 1.0 inch) and the open end width is approximately 39 millimeters (about 1.5 inches).

[033] As shown in FIG. 3a, in one embodiment of the invention, the flat base 120 of the taco shell 110 is wider than the rounded base 20 of the conventional taco shell 10 illustrated in FIG. 1. The base 120 of the taco shell 110 has been increased so that the height (represented by letters "Dh" in FIG. 3a) of the shell 110 is now approximately 1.50 to 4.0 times the base width  $D_b$ . Because of its width  $D_b$ , the base 120 of the taco shell 110 is able to overcome the destabilizing effect presented by the normal variations in the surface topography of a taco shell 110. Thus, the base 120 allows the taco shell 110 to stand upright without assistance when the taco shell 110 is being filled with taco filling. Also, the base 120 allows a taco, which has been partially consumed, to stand upright without assistance.

[034] In one embodiment, the taco shell 110 has a height of approximately 51 to 65 millimeters (about 2.0 to 2.5 inches), a base width  $D_b$  of approximately 19 to 32 millimeters, and an open end width  $D_e$  of approximately 32 to 39 millimeters. This taco shell's relatively narrow open end width  $D_e$  and its low height  $D_h$  to base width  $D_b$  ratio results in a self-standing taco shell 110 that is especially stable in the upright position. This taco's relatively broad flat base 120 allows the taco shell 110 to successfully overcome the destabilizing effect presented by the normal variations in the surface topography of a taco shell.

[035] In one embodiment of the invention, the base width  $D_b$  of the taco shell 110 is such that the taco height  $D_h$  is less than 4.0 times the base width  $D_b$ . In another embodiment, the height  $D_h$  of the taco shell 110 is approximately 1.75 to 3.35 times the base width  $D_b$ . In yet another

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Db of the taco shell 110 is no wider than the distance an average child mouth may comfortably open when consuming a taco.

[039] A comparison of the taco shell 110 (illustrated in FIG. 3a) to the conventional taco shell 10 (illustrated in FIG. 1) shows the cavity 135 of the taco shell 110 is larger than the cavity 35 of the conventional taco shell 10. Consequently, the taco shell 110 can hold a greater amount of taco filling than the conventional taco shell 10. This is advantageous because the taco shell 110 can be filled with greater amounts of meat and still have room for adequate amounts of all other available fillings. Typically, a taco shell filled with adequate amounts of meat and all other available fillings will have greater flavor and, as a result, will be preferred by a taco consumer. Another advantage of the taco shell 110 is that the larger cavity 135 and base 120 allow a utensil (e.g., spoon) to be used to access the base of the taco shell 110 when used to load the taco shell 110 with taco filling.

[040] The configuration of the taco shell 110 (shown in FIGS. 3a, 3b and 3c) causes the shell 110 to fail primarily at one of its two curved segments 145. This failure occurs primarily at these segments because stress concentrations arise at the curved segments 145. The smaller the radius of a curved segment 145, the greater the stress concentration therein and the more likely the shell 110 will fail at that location.

[041] As shown in FIG. 3d, when one of the two curved segments 145a, 145b fails, a L-shaped shell section 150 remains. The L-shaped shell section 150 comprises the flat segment 140 and one sidewall 115b joined by the remaining unbroken curved segment 145b. Since the resulting L-shaped shell section 150 has a sidewall 115b connected to the flat segment 140, the shell 110 can still retain the taco filling 155, including any taco sauce and meat juice. Thus, unlike a conventional taco shell 10, the taco shell 110 can retain its filling 150 though the shell 110 has failed.

[042] As indicated in FIG. 3d, the free sidewall 115a slides towards the other sidewall 115b until its progress is arrested by the taco filling 155 contained in the cavity 135. The taco can then be consumed like a sandwich.

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[048] The food trough 160 can be made in many different sizes. Generally, the food trough 160 is longer (the length depicted in FIG. 4 by the dimension D1) than it is wide (the width depicted in FIG. 5 by the dimension Db).

5 [049] FIG. 5 is an end elevation view of the same self-standing food trough 160 shown in FIG. 4. As shown in FIG. 5, the food trough 160 includes a pair of opposed sidewalls 162 that are interconnected by a flat base 164. The top edge 166 of each sidewall 162 is free of connection to the opposing sidewall 162, creating the open end 168 of the trough 160. The  
10 sidewalls 162 and base 164 define a cavity 170 in which an edible filling is placed.

[050] The base 164 comprises a flat segment 172, which is bordered by two curved segments 174. Each curved segment 174 serves as a transition from the base 164 to a sidewall 162. In one embodiment of the trough 160, its  
15 curved segments 174 will have ranges of radii similar to those of the taco shell 110. The trough 160 have a range for angles of divergence (represented by angle "A" in FIG. 5) that are similar to those of the taco shell 110.

[051] In one embodiment of the food trough 160, its height Dh will be less than the height Dh of the taco shell 110. In another embodiment, the  
20 height Dh of the food trough 160 will be limited to the distance an average adult mouth can comfortably open when consuming a sandwich. In another embodiment, the height Dh of the food trough 160 will be limited to the distance an average child mouth can comfortably open when consuming a sandwich. In yet another embodiment, the height Dh of the food trough will  
25 be approximately 12 to 25 millimeters (about 0.50 to 1.0 inch).

[052] In the large embodiment of the food trough 160, its base width Db will be at least approximately 25 millimeters. In another embodiment, the base width Db of the food trough 160 will be limited to the bite width of an average adult mouth. In another embodiment, the base width Db of the food  
30 trough 160 will be limited to the bite width of an average child mouth. In yet

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formed into self-standing taco shells having substantially flat bases (block 230).

5 [057] During the forming process, the tortillas are placed on molds and the tortillas conform to the molds (block 230). The molds can be a wire mesh mold, a wire cage mold, a combination wire mesh/cage mold, or a conventional mold having upper and lower plates. In either case, the molds are flat-bottomed and have cross-sectional elevations like the self-standing taco shells 110 shown in FIGS. 3a, 3b and 3c and as discussed above. Like the taco shells 110 illustrated in FIGS. 3a, 3b and 3c, the curved segments of the mold may have large, medium or small radii as discussed above.

10 [058] The conformed tortillas are then fried and adopt the form of the molds (block 240). The tortillas exit the fryer as fried self-standing taco shells having substantially flat bases and a moisture content of less than about 6%. Optionally, the fried tacos can be partially defatted by oil draining and/or hot air oil removal. Since the formed tacos are still plastic or pliable for short periods while still hot immediately after frying, care should be taken to preserve the desired square bottomed shape. Oil is allowed to drain from the taco shells as they cool (block 250) and harden. In another embodiment, the tortillas are baked to a final moisture content of less than 6% to form low fat shaped rigid tacos. A number (e.g., 3-6) of the cooled hardened rigid taco shells are then nested (block 260) together into nested quantities and these nested quantities preferably provided with an intermediate spacer (not shown) and packaged (block 270) such as by providing one or more of the nested quantities onto a support board and then a film over wrap.

20 [059] Minimizing the formation of discontinuities (e.g., bubbles and voids) in a taco shell can be a challenge when commercially producing taco shells. Discontinuities in taco shells can be minimized by providing masa flour of the proper granulation, using the proper ratios of ingredients, maintaining the proper moisture level in the dough, baking and frying properly, and avoiding the use of taco shell molds having complex geometries. Because the flat-bottomed molds have simple geometric characteristics, the

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the one or more tacos in an upright position for another individual to or machine to fill with other types of taco filling. Finally, in one embodiment, an individual or machine leaves one or more taco shells 110 in an upright position for another individual or machine to fill with taco filling.

5     **[062]**           The self-standing taco shell 110 makes it easier to prepare multiple tacos at the same time. This advantage is especially desirable in fast food, cafeteria and party environments where multiple tacos are being prepared at one time.

10    **[063]**           Still another advantage of the present tacos is that even if taco breakage occurs along either connection between flat base and sidewall, the flat base and remaining sidewall forms a ledge minimizing loss of the added fillings to allow for consumption completion with reduced mess.

15    **[064]**           Also, another advantage of a taco made using the taco shell 110 of the present invention may be presented for consumption in an upright and filled orientation.

**[065]**           Although the present invention has been described with reference to preferred embodiments, persons skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the invention.

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10. The taco shell of claim 5 wherein the height of the taco shell is about 57 to 77 millimeters and the base width of the taco shell is at least about 16 millimeters or greater.

11. The taco shell of claim 5 wherein the height of the taco shell is about 57 to 70 millimeters and the base width of the taco shell is about 19 millimeters or greater.

12. The taco shell of claim 5 wherein the height of the taco shell is about 57 to 70 millimeters and the base width of the taco shell is about 25 to 26 millimeters.

13. The taco shell of claim 5 wherein the height of the taco shell is about 57 to 70 millimeters and the base width of the taco shell is about 21 millimeters or greater.

14. A method of making a stable, self-standing, taco shell, comprising:

providing a tortilla; and

placing the tortilla on a mold configured so the resulting taco shell has a first sidewall and a second sidewall interconnected by a substantially flat base, and the height of the resulting taco shell is about 1.50 to 4.0 times the base width of the taco shell.

15. The method of claim 14 wherein the height of the resulting taco shell is about 1.75 to 3.35 times the width of the base.

16. The method of claim 14 wherein the height of the resulting taco shell is about 2.0 to 3.0 times the width of the base.

17. The method of claim 14 wherein the height of the resulting taco shell is about 2.0 to 2.5 times the width of the base.

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a first curved element interconnecting the first sidewall element to the flat base element; and

a second curved element interconnecting the second sidewall element to the flat base element.

24. The taco shell of claim 23 wherein at least one the elements has a thickness of less than 1.5 millimeters.

25. The taco shell of claim 23 wherein at least one the elements has a thickness of at least 1.5 millimeters.

26. The taco shell of claim 23 wherein at least one of the curved elements has a radius of about 6 millimeters or greater.

27. The taco shell of claim 23 wherein at least one of the curved elements has a radius of about 3 to 6 millimeters.

28. The taco shell of claim 23 wherein at least one of the curved elements has a radius of about 3 millimeters or less.

29. A method of making a stable, self-standing, taco shell, comprising:

providing a tortilla; and

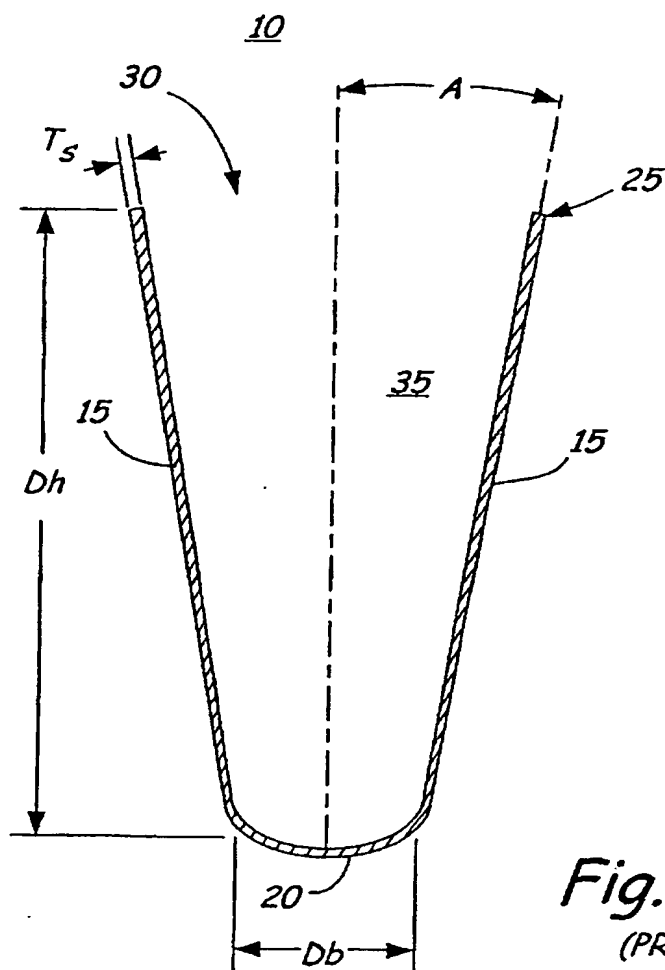
placing the tortilla on a mold configured so the resulting taco shell has a first sidewall element, a second sidewall element, a substantially flat base element, a first curved element interconnecting the first sidewall element to the flat base element, and a second curved element interconnecting the second sidewall element to the flat base element.

30. The taco shell of claim 29 wherein at least one the elements has a thickness of less than 1.5 millimeters.

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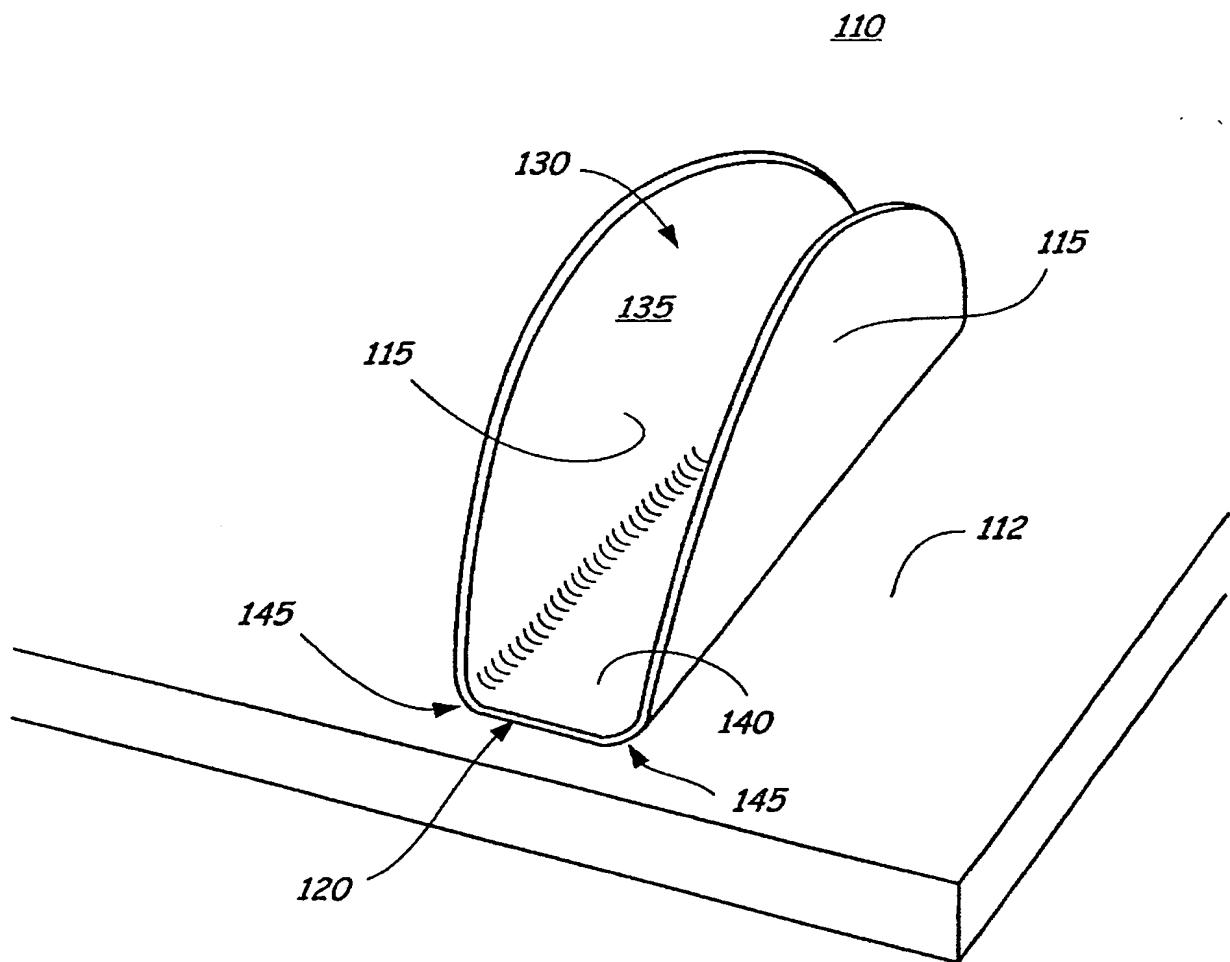
38. The method of claim 35 wherein the act of selecting includes selecting a self-standing taco shell with at least one of the curved elements having a radius of about 6 millimeters or greater.
39. The method of claim 35 wherein the act of selecting includes selecting a self-standing taco shell with at least one of the curved elements having a radius of about 3 to 6 millimeters.
40. The method of claim 35 wherein the act of selecting includes selecting a self-standing taco shell with at least one of the curved elements having a radius of about 3 millimeters or less.
41. The method of claim 35, wherein the act of filling the at least one taco shell with taco filling is practiced prior to placing the at least one taco shell upright on the preparation or use surface.
42. A method of preparing a taco, comprising:  
placing on a generally flat surface a self-standing taco shell  
having a volume; and  
filling at least a portion the volume of the self-standing taco shell  
with an edible foodstuff.
43. The method of 42 then further comprising filling at least a portion of the volume with at least another edible foodstuff.
44. The method of claim 42, wherein the act of placing comprises placing at least two self-standing taco shells each having a volume on a surface.
45. The method of claim 44 further comprising filling a portion of the volume of each of the self-standing taco shells with an edible foodstuff.
46. The method of claim 45, wherein the act of filling comprises filling a portion of the volume of each of the self-standing taco shells with an edible foodstuff that includes meat.

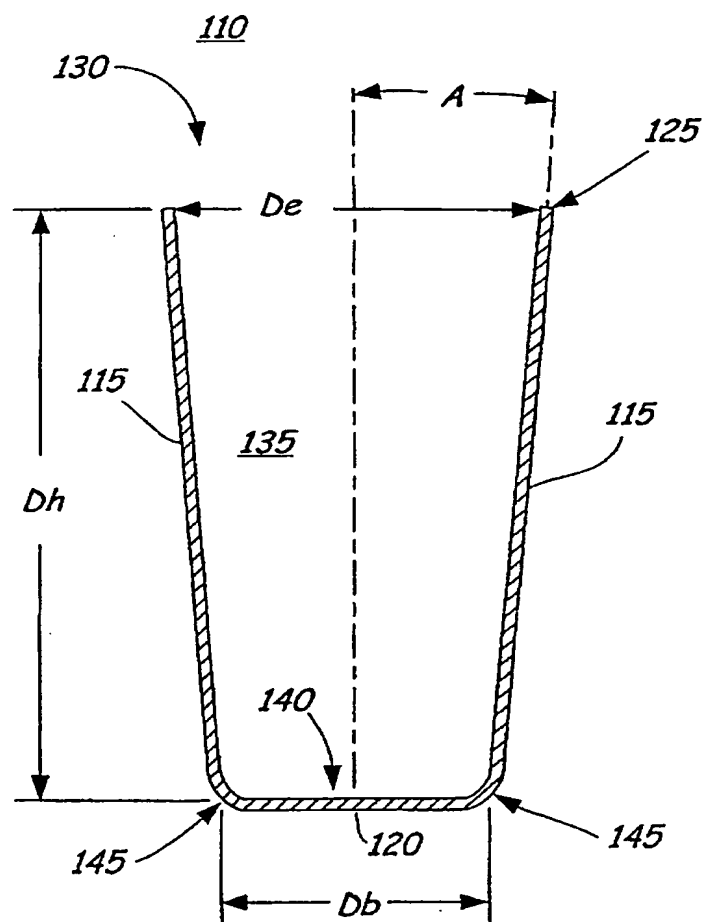
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**Fig. 1**  
(PRIOR ART)

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*Fig. 2*



*Fig. 3a*

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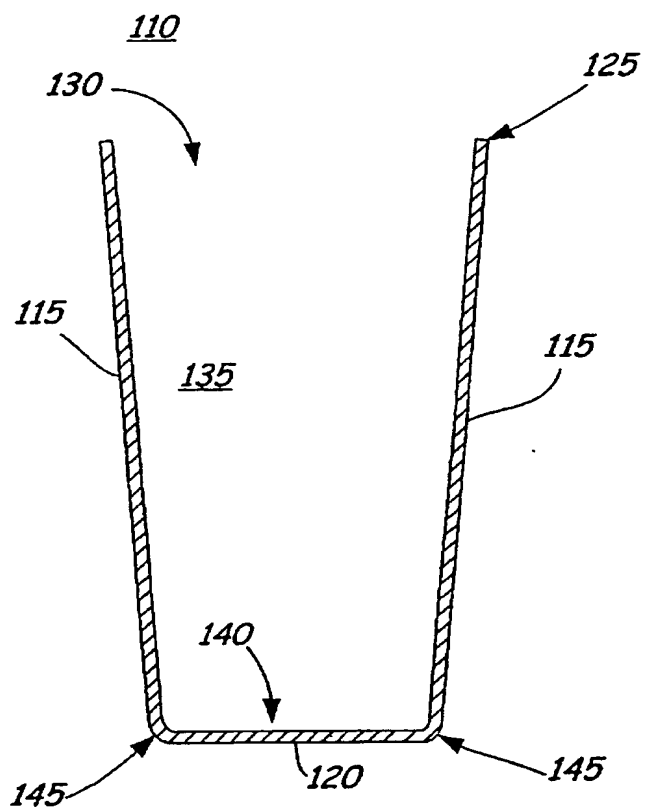


Fig. 3b



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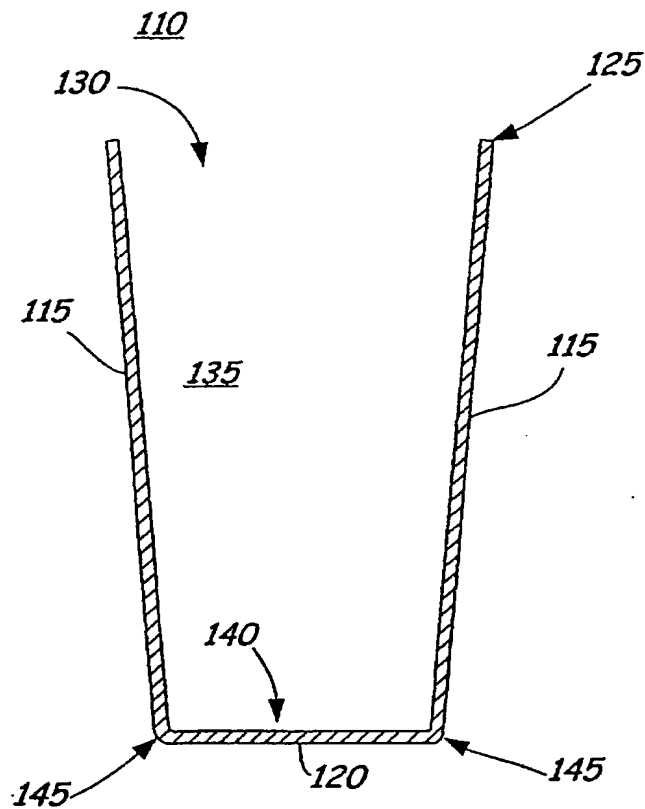


Fig. 3c



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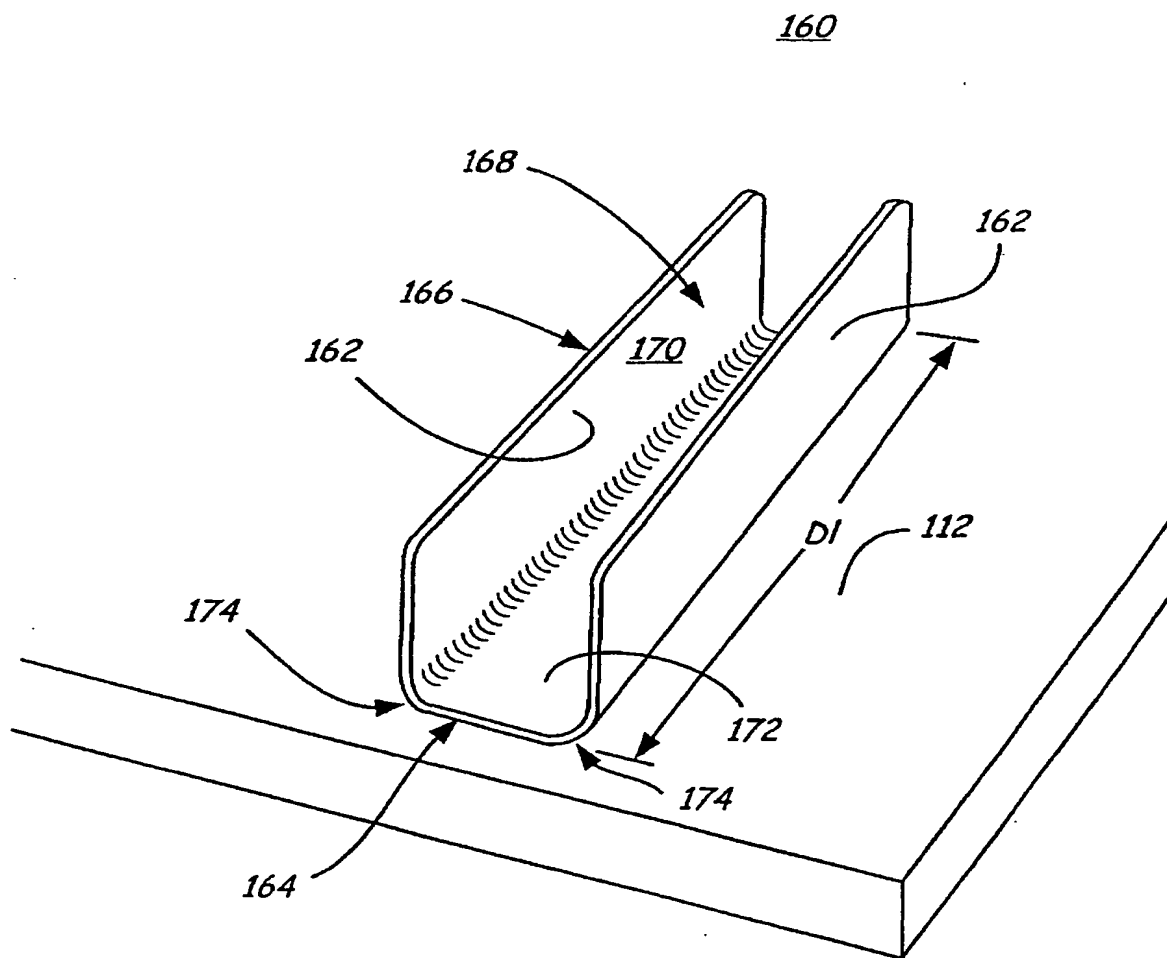


Fig. 4

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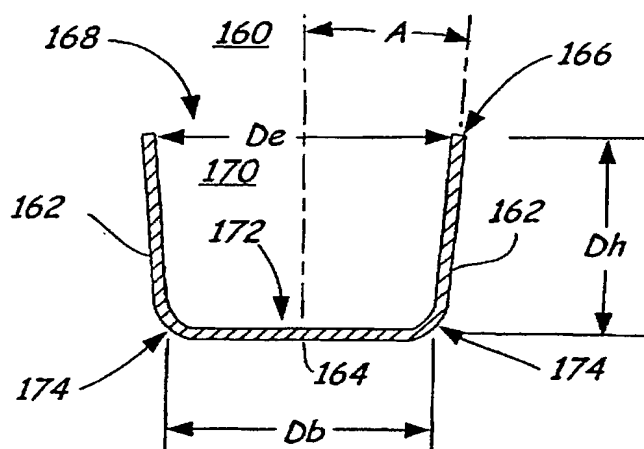


Fig. 5

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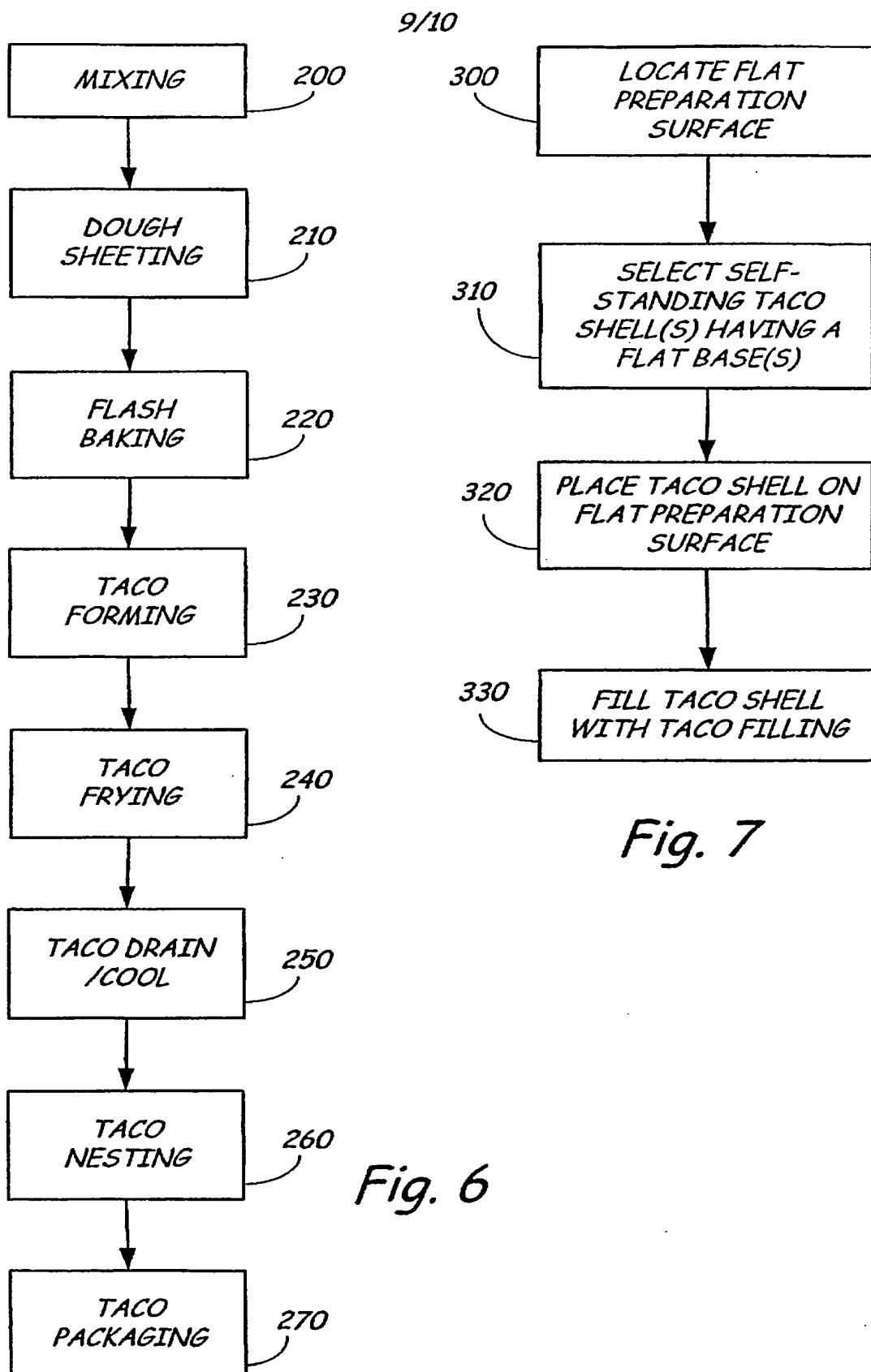
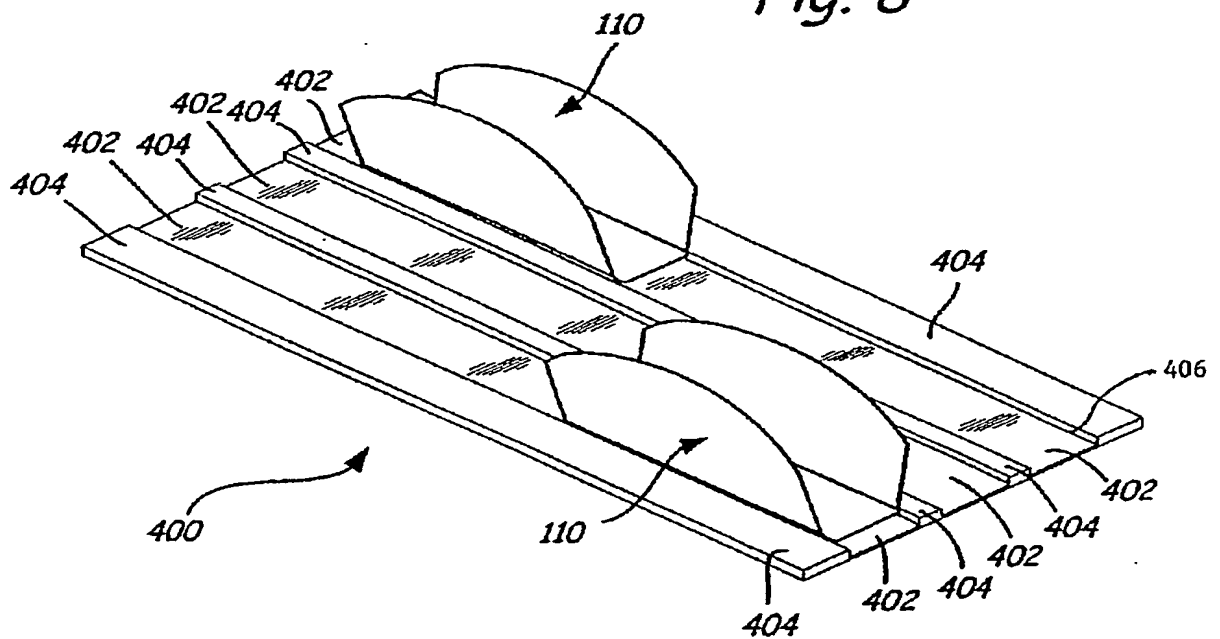


Fig. 7

Fig. 6

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Fig. 8



# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/36474

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A21D 13/00; A23L 1/10

US CL : 426/138

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 426/138

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	U.S. 5,993, 871 A (BEEHLER) 30 NOVEMBER 1999. (30.11.99), See entire document.	1-53
Y	D 277,234 A (BANK) 22 JANUARY 1985. (22.01.85), See the figures.	1-53
Y	D 278,199 A (RICHARDS) 02 APRIL 1985 (02.04.85), See the figures.	1-53
Y	D 376,893 A (GORNET) 31 DECEMBER 1996 (31.12.96), See the figures.	1-53
Y	U.S. 5,002,783 A (RUIZ) 26 MARCH 1991 (26.03.91), See the entire document.	1-53
Y	U.S. 5,298,273 A (ITO) 29 MARCH 1994 (29.03.94), See the entire document.	1-53
Y	U.S. 4, 896,820 A (HARRINGTON) 30 JANUARY 1990. (30.01.90), See entire document.	1-53
Y	D 393,136 A (GORNET) 07 APRIL 1998.(07.04.98), See the figures.	1-53
Y	D 339,899 A (KITTLESON) 05 OCTOBER 1993 (05.10.93), See the figures.	1-53

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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Date of the actual completion of the international search

21 March 2003 (21.03.2003)

Date of mailing of the international search report

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